REMARKS

Claims 6-10 remain in the application. Claims 1-5 have been canceled.

The application has been amended so as to place it in condition for disposal at the time of the next Official Action.

In the course of this revision, subject headings have been inserted at the appropriate locations throughout the specification in a manner consistent with the preferred guidelines set forth at 37 CFR §1.77 and §601 of the Manual of Patent Examining Procedure (MPEP).

Claims 1, 2 and 4 were rejected under 35 USC §103(a) as being unpatentable over CREWSON et al. 6,063,267 in view of the abstract to the Japanese Publication No. 1,182,543 and VAN HEESCH et al. 6,033,565. The Official Action states that the primary reference to CREWSON et al. discloses generation of electromagnetic fields by field generating coils wrapped around a pipe and generation of alternating electromagnetic field forces around such pipes. The claims are stated to differ in requiring a sensor to sense a parameter related to system function, which sensor comprises a field measuring coil mounted near the field generating coil and associated feedback circuit. It is advanced that the abstract of the Japanese Publication '543 teaches such a sensor and feedback circuit. It is concluded that it would have been obvious to one having ordinary skill in the art to have

augmented the CREWSON et al. system by providing such sensor and feedback circuit as taught by the Japanese reference so as to maintain optimum current and power of the generated electromagnetic field. The tertiary reference to VAN HEESCH et al. is relied upon as teaching an electrical field measuring means in the form of a coil wrapped around a pipe which contains a fluid being treated by electrical field generating means. Accordingly, it is further concluded that it would have been obvious to one of ordinary skill in the art to have further provided a measuring coil as suggested by VAN HEESCH et al. in the system of CREWSON et al. as modified by the abstract of the Japanese Publication, so as to monitor the generated fields in such a way as to minimize influences of background and electrical and electromagnetic interferences.

Reconsideration of the above rejection is respectfully requested for the following reasons.

Before addressing the outstanding rejection, a concise analysis of the various publications mentioned either in the Official Action, in the original specification, or cited by applicant would seem beneficial.

By arranging all the publications in alphabetical order, the following list results:

DE19502990
DE19505642

JP03047582
US6,063,267 CREWSON et al.
US6,033,569 VAN HEESCH et al.
US5,902,[illegible] PANDOLFO
US5,514,263 = STEFANINI = EP0491559
US5,074,998 = DE BAAT DOELMAN = EP0357182
US5,171,431 SCHULTE
US5,106,491 SCHULZE et al.
US4,755,288 MITCHELL et al.

In general several systems are known comprising only a field generator in the form of a coil assembly near or around a fluid flow channel and an electrical voltage source for powering the coil assembly, such that a magnetic field is developed in the fluid. The following publications belong to this type:

CREWSON et al. A pipe unit 12 containing at least one coil connected to a power supply 14. In operation a currents of the type illustrated in fig 6 runs through the coil.

PANDOLFO System comprising a number of cooperating coils. Details of the power supply are not provided.

SCHULTE A number of coils 7, 8 around a pipe section 6 powered by a variable frequency generator 20. The frequency is determined by a frequency controller 24 and the amplitude is determined by an amplitude controller 39.

SCHULZE et al. Housing with a number of baffle plates which guide the fluid along a meandering flow path. A coil is positioned around the housing and is powered by an electronic circuit as shown in figure 7.

MITCHELL et al. System comprising a number of magnetic field generators embodied either as permanent magnets or as electromagnets powered from a DC source. There is an auxiliary circuit for measuring the temperature and activating a blower in case the temperature rises too much.

All the systems of the above mentioned five US patents have the disadvantage that the user has no means for influencing the generated field to obtain the desired result, that is complete descaling of the fluid flow path. If the field is not strong enough, the obtained result will not be sufficient. On the other hand, if the field is too strong, the user is just spending too much energy and is therefore wasting money.

To solve this problem, one has already thought of feed back systems in which a parameter related to the scale deposition is measured by a sensor delivering a signal to an electronic circuit which in turn controls the generator to power the coils. The following documents are related to this type of feed back systems, as is the system of the present invention:

STEFANINI = EP0493559 The sensor in this system is a microphone. The microphone picks up any sound that is generated as a result of turbulence in the fluid flow path. This turbulence relates to the surface effect on water passing over obstructions such as lime deposits.

DE BAAT DOELMAN = EP0357102 The sensor in this system is a flow rate transducer 8 which provides a signal to an electronics circuit 2 for increasing the field strength when the fluid flow rate is decreasing and vice versa

DE19502990 The sensor in this system is an electrode which in combination with a measuring circuit develops a signal which is representative for the fluid flow rate. This signal is used for increasing the field strength when the flow rate is decreasing and vice versa.

DE19505642 The sensor in this system is an elastic electrode carrying a number of strain gauges. The signal generated by means of this electrode is used for

increasing the field strength when the fluid flow rate is decreasing and vice versa.

JP03047582 The sensor in this case is a combination of two metal plates EP1 and EP2 positioned on the wall of the fluid flow path. By means of these electrodes the electromotive force developed by the generated electromagnetic field is detected. The detection signal is used to adjust he power supplied to the field generating coils. Unfortunately this document does not provide details about the sensor plates and the functioning thereof. However, an identical circuit is described in SCHULZE et al., see figure 10 and corresponding description on column 10 lines 23-48. The two plates are arranged such that the field lines of the electromagnetic field extend perpendicular to the imaginary line through the centers of both plates. An electric current of which the magnitude is dependent on the flow rate of the fluid is generated between both plates and measured by the detection circuit connect to both plates. In other words the plates EP1 and EP2 are used to generate a fluid flow dependent signal.

It should be pointed out that this Japanese publication does not describe a measuring coil as is advanced in the Official Action.

In summary, there are four documents (DE BAAT DOELMAN, DE19502990, DE19505642, and JP03047582) in which a fluid flow rate dependent signal is used to control the power supplied to the field generating coil(s).

Moreover, there is one document (STEFANINI) in which a scale deposit dependent signal is developed to control the power supplied to the field generating coil(s).

In sharp contrast, the system of the present invention is not directed to a fluid flow rate dependent control or scale

deposit amount dependent control of the field generator, but is directed to a total field dependent control of the generating coil. The total field in the fluid flow, that is the fluid caused by the generator coil in combination with the field caused by other field producing apparatuses in the neighborhood, is measured by a sensor which in this case is embodied as a measuring coil connected to an electronic circuit acting as a field strength meter. Consequently, it is initially pointed out that the sensor is different from that of the above state of the art, and secondly, the parameter to be measured, that is the total field in the fluid flow, is different from that of the prior art.

The present invention does not seek protection of a field strength meter as such, since field strength meters have been known for a long time and belong to the prior art.

Although the VAN HEESCH et al. reference was not discussed above, the same describes a system for treating gases or fluids with a technique which is quite different from the field generating coils of the other mentioned publications. In VAN HEESCH et al., use is made of a corona discharge generated in the fluid flow path by means of a corona wire positioned in the center of the fluid flow channel, and powered by a very high voltage source. The high voltage pulses supplied by the source have a repetition frequency of up to 1000 Hz and a peak voltage of up to

18[illegible] kV (see column 4, lines 8-13) are generated by a complicated power source including a spark gap, and a so-called transmission line transformer (TLT) (see column 4, lines 3[illegible]-38). This in sharp contrast to the rather simple power supply circuits used for feeding the coils in the above-mentioned publications.

In addition, the apparatus described in VAN HEESCH et al. is installed in an electromagnetically compatible case formed by housings of good conducting material. In other words, the apparatus is thoroughly screened to avoid any interaction with the surrounding. If one were to install such a corona discharge device in open air, the TV and radio reception in a large area around the device would be heavily disturbed. The result of these screening measures is also that fields generated outside the corona space would not reach the corona space so the basic problem, for which a solution is provided by the present invention is not even existent in this reference.

Indeed coil shaped sensors are used in VAN HEESCH et al. For proper functioning these sensors have to be installed around the corona wire or around the power supply connection feeding the corona wire (see detector 50 and detector 56 in figure 2). Installation afterwards in an existing apparatus is hardly possible.

In sharp contrast, the measure proposed in the herein claimed invention can be applied very easily afterwards in any of

the prior art systems described in any of the above-mentioned publications.

It is respectfully submitted that when considering the applied references collectively, there would be no reason, motivation or suggestion to combine their respective teachings in the manner necessary to achieve the herein claimed invention. Indeed, a combination of CREWSON et al and the Japanese abstract, as well as VAN HEESCHet al., would certainly not result in an apparatus having the characteristic features recited in Applicant's claims.

Claims 3 and 5 were rejected under 35 USC §103(a) as being unpatentable over the basic combination of CREWSON et al. in view of the Japanese abstract and VAN HEESCH et al., and further in view of SHULTE 5,171,431. The SCHULTE reference is relied upon as teaching the use of an amplifier in an electronic circuitry. It is concluded that it would have been obvious to one of ordinary skill in the art to have further modified the CREWSON et al. system by providing an amplifier as taught by SCHULTE, so as to allow control of the generated field to have a continuously varying output for more effective treatment of the liquid within the pipe.

Reconsideration of the above rejection is respectfully requested for the following reasons.

While the SCHULTE reference may disclose the feature for

which it was relied upon, namely the use of an amplifier, it nevertheless fails to remedy the fundamental shortcomings of the basic combination of references, so as to render the herein claimed subject matter obvious within the meaning of 35 USC §103. Indeed, claims 8 and 10 are related to the combination of a powering circuit and a field strength meter, whereby the signal generated by the field strength meter influences the functioning of the powering circuit, more specifically, the amplification value of the amplifier therein. It is respectfully submitted that this is neither described, nor suggested by any of the cited references, alone or in combination.

In view of the present amendment and the foregoing remarks, therefore, it is believed that this application has been placed in condition for allowance. Reconsideration and allowance on the basis of new claims 6-10 are accordingly earnestly solicited.

In the event that there are any questions relating to this amendment or to the application in general, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that the prosecution of this application may be expedited.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

overpayment to Deposit Account No. 15-0125 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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APPENDIX:

The Appendix includes the following item(s):

- a marked-up version of the Abstract or the Disclosure

Abstract of the Disclosure

System for treating fluids, especially water, in a pipe to resist scale deposits from building up in the pipe, includes a field generating coil (10) mounted exteriorly of the pipe, an electronic circuit (14) for energizing the coil to develop an alternating electromagnetic field in the fluid, a sensor (18) for sensing a parameter related to the functioning of the system and for generating a parameter ~~dependant~~ dependent signal, a feed back circuit for feeding back the parameter dependent signal to the electronic circuit to control the electronic circuit, wherein the sensor comprises a field measuring coil (16) mounted exteriorly of the pipe near the field generating coil, the feed back circuit comprises [[the]] field strength measuring electronics which together with said measuring coil acts as a field strength meter.